Notebook Series -- Notebooks by Edison and Other Experimenters
Recorder and Recording Experiments -- A. M. Kennedy Books
Notebook, N-14-02-28.2

This notebook was used by Absalom M. Kennedy during February-March 1914. The entries pertain to experimental recorders and amplifiers. The initial entries describe a series of experimental recorders produced by Harry W. Doyle. Each entry indicates the details of construction and the manner in which the parts were sealed and fastened together. Additional information about these recorders can be found in the unselected notebook, N-14-01-27.2. Following these entries is a daily record of experiments and tests performed by various laboratory staff on phonograph recorder and reproducer parts. These include tests with various distances, amplification speeds, types of recorders, and positions of recorders and voices. Some of the entries report results, such as loudness and quality of recorded tone. The notes indicate that the experiments were done by Archie D. Hoffman, Harry E. Humphrey, Miller Reese Hutchison, Alexander N. Pierman, and employees named Harper and Taylor (probably Henry A. Taylor). The front cover is labeled "Recording Experiments." The inside front cover is inscribed "Recording and Amplifying." The pages are unnumbered. Approximately 25 pages have been used.

59890
Acme Co.,
MFG. STATIONERS,
96 JOHN ST.
AND
19 PLATT ST.
NEW YORK.

Recording and
amplifying.

RECORD OF
RECORDERS.
made by Doyle.

#1 Standard Mica .0046"
2 Gaskets
.038" sapphire - .125" lap.
Bees wax for sealing diaphragm
to recording head.
Shellac to seal Arm to Diaphragm
" " " Sapphire to Arm.

~~Tested out O.K.~~

#2 Mica .008"
2 Gaskets
.038" sapphire - .125" lap.
Bees wax for sealing diaph.
to recording head.
Shellac to seal Arm to Diaphragm.
" " Sapphire to Arm

#3

Mica .0025"
2 Gaskets
.038" Sapphire - .125" lap.
Bees wax for sealing diaphragm
& gasket to recessing head
Shellac to seal arm to diaphragm
" " " Sapphire to arm.

#4

#5

#6

#7

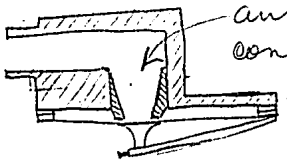
#8

Standard Mica .0046" diameter
& gaskets
.038" sapphire - .125" lap.
Standard sealing and fastening

#9

#10 Standard

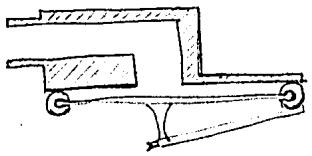
#11 Standard Construction except



ancillary brass cone tube to concentrate sound on center of diaphragm.

#19

Special recorder made with rubber tube as supplied by Mr. Perman.



2/28/14.

Test made with 2 driving pulleys on amplifier, both top and bottom mandrels. Gear also in mesh. Harper suggested that the amplifier may run better if driven from top or from both pulleys.

Tests were made driving from both pulleys, from bottom pulley and from top pulley and developed that the best results were obtained when driving from the bottom pulley. No reason therefore to change.

3/7/14

Test made amplifying at different speeds.

Tested a piano record at 160-140-120-100 80-60-40 R.P.M.

Results not conclusive since the amplification was of a continuous record of varying loudness.

3/7/14.
Amplification from 7 records of alto voice in Christian Talks of Hoffman. Same voice used in each case.
Amplification of above at 40-60-80-100-120-140-160 R.P.M.
Results conclusive:
At low speeds the tones were soft and full - became louder and more natural at 100 R.P.M. Above this became still louder but sharp.

3/6/14. Taylor made an experiment on amplifying. A piano record was made which when amplified as usual sounded rather like a banjo. By increasing the speed of amplification to 120 R.P.M., a much better quality of record was produced.

3/8/14. Amplification of 7 duplicate records made by Mr. R.T. each in loud and low tones. These were amplified at 40-60-80-100-120-140-160 R.P.M. The first three were soft and natural but not loud. The fourth was still of good quality and louder. The remainder were increasingly loud and sharp except the last which was not so loud as the one at 140 R.P.M.

The low records perhaps were best at 120 R.P.M. while the loud records were best at 80 or 100 R.P.M.

At low speeds of amplification the reproduction is full and natural but low and with considerable surface.

At high speeds of amplification the reproduction is thin and sharp and loud.

Tear and other external noises are reproduced at low speed.

8/26/14.
Tests by Mr. Humphries in padded cell.

Recorder #3 - Test at 5 ft in good full tone - Black speech favored - Trying to blast and at 15', speaking to favor the distance

Recorder #1 - Test at 5' in good full tone - black speech favored - trying to blast and at 15', speaking to favor the distance

Recorder by Mr. Purman. Same tests.

Results apparently showed #3 recorder best, Mr. Purmans next and #1 last, all however good.
Mr. Purmans recorder appeared smoother than the others.

3/1/14.

Tests with Miss Humphreys voice.

Made with #3 Recorder.

Results - good - full - sweet both of voice and of piano. Tendency to blast however on high or powerful or sound notes.

Miss Humphreys voice is good - her qualities of expression excellent - her enunciation fair - She should record fine with practice.

C913

3/2/14

Mr. Humphries Recording.
#3 Recorder used

Distance	Voice	Result
4'	Full Tone	good
4'	" "	"
6'	" "	"
10'	" "	"
15'	" "	"
15'	loud "	"
4'	rapid talking	"
6'	" "	"
10'	" "	fair
15'	" "	"
6'	dramatic "	"
6'	good full tone	very good
6'	very loud	least
10'	" "	"
5'	Reading from paper very loud	"
5'	" " " medium	"
5'	ordinary conversational tone	fair
5'	stage " "	fair

3/3/11

Mr. Humpherics Recording
#3 Recorder

Distance	Voice	Results
6'	fast conversation	good
10'	" "	fair
15'	" "	fair
6'	light voice, full tone	good
6'	rapid conversation	good
10'	" "	fair
15'	" "	"
6'	slow conversation, slightly paused	good
10'	" " " "	very good
15'	" " " "	fair
4'	rapid " quietly	good
4'	slow " "	good
2'	rapid " "	"
2'	slow " "	"
1'	slightly exaggerated	"
2'	" "	"
1'	Full Deep Tone	"
2'	" " "	"

(25)

3/5 Miss Dunwoodie - Sung at Piano.
#3 Recorder

20' - Singing
Results generally good with exception of blasts on high strong or nasal sounds

15' - slightly better than at 20'

Marking tend varying between 6' and 20', best of all

Same tests with #1 recorder.
good. less tendency to blast

3/6/14
Aud. Miss Dinwoodie-Hayes - Baby Piano
Recorder # 3
Recording Machine Standard position

20' - Not enough volume

15' - better than above.

Same test but with recording machine & horn on floor.

20' - Volume increased and tones have not so much sharpness or edge as above.

15' - Same as 20' but not quite so pronounced.

3/7/14.

Mr. Humphreys Recording.
#3 Recorder used.
Recorder in standard position.

Distance	Voice	Result
1'	Whispering	Very good.
2'	"	" "
3'	"	" "
4'	"	Practical
6'	"	"
10'	"	Can hear but not loud enough
15'	"	same
6'	Deep tone	very good
10'	" "	good
20'	" "	fair
10'	Loud Tone	too loud
15'	" "	very good
20'	" "	better than 15'
4'	Deep, heavy tone, Sailors dialect	too loud
6'	" " " " "	practical
10'	" " " " "	very good
15'	" " " " "	" "
20'	" " " " "	good.

3/7/14. Mr. Humphries Recording.
#3 Receiver used.
Recording Machine standard position.

Walking test.

Distance	Voice	Result
20'	Full tone - walking	good
15'	" " "	very good
10'	" " "	good
6'	" " "	triple loud
4'	" " "	loud-
20'	Declamatory or loud Tone walking	good
15'	" " " "	good
10'	" " " "	good
6'	" " " "	faint blast
4'	" " " "	blast

These tests repeated with same results.

It was noted that the results when walking were better than when standing.

3/7/14.

Mr. Humphries Recording.
+ 3 Reader used.
Recording Machine Standard Position.
Test, standing firm and balanced on toes.

Distance	Voice		Results
20'	Creatural	- Standing firm	good.
20'	"	- Balancing	Very good.
15'	"	- Standing firm	good.
15'	"	- Balancing	Very good.
10'	"	- Standing firm	good
10'	"	- Balancing	Very good
6'	"	- Standing firm	Good
6'	"	- Balancing	Very good
20'	Declamatory	- Standing firm	Fair.
20'	"	- Balancing	Good
15'	"	- Standing firm	Good
15'	"	- Balancing	Very good
10'	"	- Standing firm	good
10'	"	- Balancing	Very good
6'	"	- Standing firm	Fair
6'	"	- Balancing	good.

Decided improvement in quality in each case when balancing on balls of feet.

2/7/14.

Mr. Humphries Recording.

#3 Recording Used.

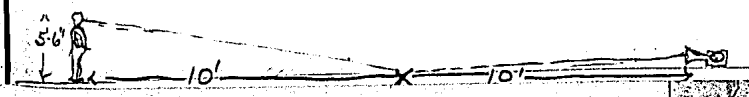
Recording machine on floor.

This test was made to determine the best distance to point the voice with recording machine on floor.

Distance Standing.	Distance Pointed at	Voice	Result.
20	15	Ordinary - Standing firm	good
"	"	" - Balancing	better
20	10	" - Standing firm	Very good
"	"	" - Balancing	best
20	6	" - Standing firm	good
"	"	" - Balancing	better
20	Horn	" - Standing firm	fair
"	"	" - Balancing	better
20	above horn	" - Standing firm	fair
"	"	" - Balancing	better

Results show that for this test voice should be pointed half way between position and recording machine.

Previous test proves that recording machine should not be used on floor except at distances of 20' or more.



3/7/14. Mr. Humpheries Recording.
#3 Recorder Used
Recording Machine Standard Position.

Distance Standing	Distance Pointed at	Voice			Result.
20	15	Loud	Voice	Standing firm	good
"	"	"	"	Balancing	better
20	10	"	"	Standing firm	good
"	"	"	"	Balancing	better
20	6	"	"	Standing firm	good
"	"	"	"	Balancing	better
20	horn	"	"	Standing firm	good
"	"	"	"	Balancing	better
20	above Horn	"	"	Standing firm	good
"	"	"	"	Balancing	better.

Results balancing in all cases better than standing firm.

3/7/14.

Doyle and Kennedy Recording
#2 Recorder Used
Recording Machine on floor.

Standing at 20' from horn, test to determine best position to point voice.

Stand	Point	Person	Result
20'	15'	Doyle	good
20'	10'		best
20'	6'		good
20'	horn		fair
20'	own		fair
20'	15'	Kennedy	good
20'	10'		best
20'	6'		good
20'	horn		fair
20'	own		fair

3/7/14 Tests by Doyle & Kennedy
+ 3 Rearden used.
Recording Machine on floor.
Repetition of former test chart
Balancing test included also.

Stand	aim	Person	Results Firm	Balance
20'	15'	Doyle	good	better
20'	10'		better	best
20'	6'		good	better
20'	horn		fair	good
20'	above horn		fair	good
20	15'	Kennedy	good	better
20	10'		better	best
20	6'		good	better
20	horn		fair	good
20	above horn		fair	good

3/24/14.

Data from Studio.

A standard recorder should have mica diaphragm from .004" to .005" thick with 2 rubber gaskets, each 1/32" thick. The gaskets must conform to the recorder head and align perfectly. Diaphragm must be aligned with gaskets. Then held firmly and temporarily fastened with o-pats, about 3 of wax. Then released and wax run all around so as to make a perfect seal.

Needle arm is to be cut from sheet aluminum about .007" thick and should measure from edge of recorder, diametrically to opposite edge of hole (about $\frac{13}{16}$"). A piece of the above sheet aluminum about $\frac{13}{16}$" x $\frac{7}{16}$" is bent over a piece of .040" wire, and by pliers & vise neatly made into ⅊ shape.

RECORDERS.

#1	Standard	.0048 diaphragm		.80
#2	"	.0047	"	.80
#3	"	.0048.	X	.70
#4	"	.0050		.85
#5	"	.0038	x	.65
#6	"	.0045	x	
#7	"	.004		.80
#8	"	.004	x	
#9	"	.0055	x	.65
#10	"	.004		.80